

THE SETTINGS OF THE EVENING AND MORNING PSALMS
ACCORDING TO THE MANUSCRIPT SINAI 1255.

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In Byzantine church music the way of reciting verses or half-verses from the Psalter seems to follow a particular pattern, a melodic structure made up of three elements: the recitation proper falling on a monotone, maybe with some elaboration, an introductory formula leading up to the recitation, and a characteristic cadence which ends the recitation and is clearly divided from the rest. Thus we may distinguish between the beginning, middle, and ending of the structure, the ἀρχή, the μέσον, and the τέλος so to speak.

The Byzantine psalm-tone is as a rule designed for the recitation of the half-verse so that the *paralellismus membrorum* of Hebrew hymn writing is reflected in the musical setting. As the connection between word and music is very close, the melodic formula has to adapt itself to the specific requirements of the text, an adaptation brought about mainly by two factors: accent and syllable-count.

Accent influences the opening phrase and the reciting tone so that the opening phrase is expanded or contracted and the formulas of the reciting tone are elaborated to reflect the distribution of the textual accents. Syllable count, on the other hand, is independent of accent and belongs entirely to the cadence. This always comprises the last four syllables of the verse or half-verse, musically stressed irrespective of text-accent. However, without invalidating this rule the music of the cadence formula may consist of tone groups as well as of single tones. The psalm-tone stresses the cadence formula more than the recitation proper and often the cadence may be separated from the recitation formulas by a punctuation mark.

In his 'Essays on Music in the Byzantine World' Strunk gives an example of the simple psalmody of the Protos adapted to the first of the concluding verses of the Ordinary psalms of Vespers, Psalm 141:8, an example taken from the manuscript Sinai 1255, f. 164^v, the manuscript we are going to look at.



In this example the characteristics of the Byzantine psalmody are obvious, 'the reciting tone is moderately inflected to throw the principal accents into relief..., the final cadence is a 'cadenza corsiva'..., the formula is mechanically adapted to the last four syllables of the text, without regard to tonic accent'.¹

The Psalter is treated differently in the various Christian rites. In the Eastern churches psalms are seldom sung or recited in their full lengths, but varied and associated with non-biblical poetry, verses from other parts of the Bible and so on. The importance of the psalmodic cadence, then, lies in its function as transition to the melody of the following text (e. g. a Sticheron or a Troparion). When this is thought to require a special preparation the ending of the cadence will be modified accordingly, not by a fixed ending, but by an ending which is determined in each case by the opening phrase of the following melody. In this respect there is similarity between the cadence and the modal signature which also takes on a special ending to harmonize the transition to the following melody. An important function of the cadence, then, is to accomodate two successive melodies to each other.

Each of the eight Byzantine modes has one or more varieties of simple psalm-tone with characteristic opening phrases and cadential formulas, but often melodic patterns and formulas are more closely connected with specific pitches in the tonal system than with a particular mode or modes.

Towards the end of the thirteenth century or the beginning of the fourteenth the famous Joannes Koukouzeles compiled the Byzantine psalm-tones systematically in an anthology called 'Ἀκολουθία', 'Orders of Service'. The book became very popular and still exists in many copies. One of the oldest is the manuscript Athens 2458, which is precisely dated by its colophon to the year 1336 A.D.

In his compilation Koukouzeles illustrated the rules for the performance of the office and the three liturgies, and where psalmody is concerned he took up the simple psalm-tones, summed up the ways of recitation in

1. Strunk, Oliver, The Chants of the Byzantine-Greek Liturgy, in: Essays On Music In The Byzantine World, pp.307-8.

Basic information for the investigation of the manuscript Sinai 1255 is taken from:

Strunk, Oliver, Essays On Music In the Byzantine World, New York, 1977.
Sadie, Stanley, ed., The New Grove Dictionary of Music and Musicians, London 1980.

Blom, Eric, ed., Grove's Dictionary of Music and Musicians, New York 1975.
In the last two sources under: Byzantine Music and Psalmody.

eight doxologies, one for each of the eight modes, and applied them to standard verses from the psalms and canticles.²



Among the most frequently used Psalms of the Service are a complex consisting of Psalms 140, 141, 129 and 116 ('κύριε ἐκέκραξα'), belonging to the Vespers and Psalms 148-150, the Ἀΐνου or Lauds, belonging to the Orthros or Morning Office. Their performance is less plain than described above because the first verse or verses of each of the two sets are sung to much more complicated melodies.

It is the aim of this article to demonstrate that these elaborate melodies to κύριε ἐκέκραξα and πᾶσα πνοὴ αἰνεσάτω τὸν κύριον actually are nothing but ornamented psalmody.

A particularly good source of material for illustrating this is the manuscript Sinai 1255 which includes also simple psalmody in its κεκραγῶν.³ So here we have an opportunity for comparisons within one single tradition.

2. Strunk, op. cit. p. 171.

3. The Kekragarion consists of verses from the Psalms 140, 141, 129 and 116 sung at Vespers. The name refers to the opening words of Ps. 140: κύριε, ἐκέκραξα πρὸς σέ. Nowadays it is usually sung by two choirs alternately, the first of which begins by singing the half-verse κύριε, ἐκέκραξα πρὸς σέ and later sings the refrains of verse 1 and 2: εὐσκόουσόν μου, κύριε. Instead of refrains certain verses are followed by stichera. For short Vespers and Vespers of the week following Easter only the first two verses of Ps. 140 are sung together with the verses followed by stichera. This is also the case at the great Church festivals.

Threskeutikē Encyclopædia, Athenai 1962-68, sub 'Ἑσπερινός, column 915.

For each of the modes Sinai 1255 has the following content⁴ with the general headline,

ἀρχὴ σὺν θεῷ ἀγίῳ τῶν κατ' ἡχῶν κεκραγαρίων ἡνωμένα μετὰ τῶν ἀναστασίμων·

Vespers,

- 1) Κύριε ἐκέκραξα (Ps. 140:1) + κατευθυνθήτω (Ps. 140:2)
- 2) ἐξάγαγε (Ps. 141:8) + Stichera Anastasima.
- 3) Δόξα πατρὶ + Theotokion Dogmatikon.

- 4) ('τοῦ στίχου') Apostichon + Alphabetika.

Orthros,

- 5) Θεὸς Κύριος.
- 6) ('εἰς τοὺς ἀλνους') Πᾶσα πνοὴ + Ἀλνεῦτε (Ps. 150:6 + 148:1,2).
- 7) ('τῇ ἀγίᾳ καὶ μεγάλῃ τεσσαρακοστῇ, εἰς τοὺς ἀλνους') Ἀλνεῦτε (Ps. 148:1).

The Stichera and the Θεὸς Κύριος have been left out as being irrelevant for our present investigation. The texts that remain are shown below (Ex. 1, p. 27). For practical reasons their lines have been consecutively numbered.

Some of the units need a little comment:

- 1-5, (Ps. 140:1): The first half-verse (1) is followed by a refrain (2. εἰσάκουσόν μου, Κύριε) and then repeated (3). The refrain is found again after the second half-verse.
- 6-8, (Ps. 140:2): Here the refrain is used at the end only.
- 9, First half-verse of Ps. 141:8 to introduce the first of the Stichera Anastasima.
- 10-11, Δόξα, ... καὶ νῦν, bipartite.
- 12-16, The introduction to this unit (12) is the last verse of Ps. 150. Then Ps. 148:1,2 follow with the refrain (σοὶ πρέπει ὕμνος τῷ θεῷ) after each verse.
- 17-20. An alternative to be used in Lent. Notice the parallelism between the arrangements of 17-20 and 1-5:

$$\begin{aligned} 17 &= 1 \\ 18 &= 2 \\ 19 &= 3 + 4 \\ 20 &= 5 \end{aligned}$$

As basis for the analysis I shall select a few characteristic motifs - recognizable even with variations in the detail - in order to observe

4. Folios 164^r-204^r.

their occurrences in the material, cf. the survey of cadences in the mode of Protos below. At times such motifs are completely stable in their neumatic shape, e.g. $\tilde{\omega} \tilde{\nu} \tilde{\alpha} \tilde{\tau}$ (Barys, lines 2, 5, 8, 12, 14, 16 and 20).

As shown by Strunk⁵ the simple psalmody is i.a. used for the concluding verses of the ordinary Psalms for Vespers and for the simple Doxologies. These items (lines 9-11 in the text, Ex. 1) will serve as starting point for the following analysis.

Protos.

a) The psalmodic cadence.

In the Protos as in the other modes (cf. Strunk p. 170) the last four syllables of the text in Psalm verse and Doxology, as was to be expected, have a fixed melodic shape, and no attention is paid to the text accents:

$$9. \quad \begin{array}{c} \tilde{\omega} \tilde{\nu} \tilde{\alpha} \tilde{\tau} \\ \alpha | b c \quad a b \quad G a \quad a \end{array}$$

$$10. \quad \begin{array}{c} \tilde{\omega} \tilde{\nu} \tilde{\alpha} \tilde{\tau} \\ \alpha a | b c \quad a b \quad G a \quad a \end{array}$$

$$11. \quad \begin{array}{c} \tilde{\omega} \tilde{\nu} \tilde{\alpha} \tilde{\tau} \\ \alpha a | b c \quad a b \quad G a \quad a \end{array}$$

In our material this cadence occurs, besides, in lines 4, 7, 12, 13, 15, 17 and 19:

$$4. \quad \begin{array}{c} \tilde{\omega} \tilde{\nu} \tilde{\alpha} \tilde{\tau} \\ \alpha | b c \quad a b \quad G a \quad a \end{array}$$

$$7. \quad \begin{array}{c} \tilde{\omega} \tilde{\nu} \tilde{\alpha} \tilde{\tau} \\ \alpha a a | b c \quad a b \quad G a \quad a \end{array}$$

$$12. \quad \begin{array}{c} \tilde{\omega} \tilde{\nu} \tilde{\alpha} \tilde{\tau} \\ \alpha a a a | b c \quad a \quad G a \quad b \quad G a \end{array}$$

$$13. \quad \begin{array}{c} \tilde{\omega} \tilde{\nu} \tilde{\alpha} \tilde{\tau} \\ \alpha | b c \quad a \quad b a \quad G a \quad b \quad G a \end{array}$$

$$15. \quad \begin{array}{c} \tilde{\omega} \tilde{\nu} \tilde{\alpha} \tilde{\tau} \\ \alpha | b c \quad a b \quad G a \quad a \end{array}$$

5. Strunk, op. cit. p. 170 ff. and pp. 307-8.

17. $\begin{array}{c} \text{ek} \\ \text{a} \end{array} \left| \begin{array}{c} \text{Twv} \\ \text{c} \end{array} \right. \begin{array}{c} \text{ou} \\ \text{a} \end{array} \begin{array}{c} \text{ou} \\ \text{b} \end{array} \begin{array}{c} \text{p} \\ \text{G} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array}$
19. $\begin{array}{c} \text{ev} \\ \text{a} \end{array} \left| \begin{array}{c} \text{Toic} \\ \text{bc} \end{array} \right. \begin{array}{c} \text{u} \\ \text{a} \end{array} \begin{array}{c} \text{psi} \\ \text{Ga} \end{array} \begin{array}{c} \text{sigma} \\ \text{a} \end{array}$

In the first of the succession of diagrammes which follow the text (p. 36) this cadence is marked by a 'C'. It is evident that the Protos melodies for the ordinary Psalms for Vespers and Lauds use the same cadence as the simple psalmody.

b) *Opening patterns.*

in 9-11 we find either an opening pattern or a repetition of the note a:

- 9). $\begin{array}{c} \text{g} \\ \text{a} \end{array} \left| \begin{array}{c} \text{e} \\ \text{a} \end{array} \begin{array}{c} \text{f} \\ \text{a} \end{array} \begin{array}{c} \text{g} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array}$
- 10). $\begin{array}{c} \text{g} \\ \text{a} \end{array} \left| \begin{array}{c} \text{d} \\ \text{e} \end{array} \begin{array}{c} \text{f} \\ \text{g} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array}$
- 11). $\begin{array}{c} \text{g} \\ \text{a} \end{array} \left| \begin{array}{c} \text{d} \\ \text{e} \end{array} \begin{array}{c} \text{f} \\ \text{g} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array} \begin{array}{c} \text{a} \\ \text{a} \end{array}$

The opening of 10 and 11, as we shall see, reappears as line-openers in the ordinary Psalms and must thus be taken for a standard psalmodic line-opener in this mode (marked 'I' in diagram 1). It is to be noted that the 'refrains' in 5, 8, 14, 16 and 20 have opening phrases of their own - the standard phrase being found only in 2 and 18. The openings in Protos vary considerably in details, cf. Ex. 2, p.28.

Note the following cases:

- 2 ≠ 18
3
4a
13b

Finally, it is to be noted also that the opening phrase, usually combined with punctuation dots, subdivides lines 4, 6, 13 and 19.

Deuterios.

a) *The psalmodic cadence.*

A comparison between lines 9, 10 and 11 reveals the following final formulas:

- 9) $\begin{array}{c} \text{Tw} \text{ o} \\ b \text{ b} \end{array} \left| \begin{array}{c} \text{Ma Ti sou} \\ c \text{ a} \text{ b} \text{ b} \end{array} \right.$
- 10) $\begin{array}{c} \alpha \text{ yi} \\ b \text{ b} \end{array} \left| \begin{array}{c} \text{w} \text{ Ma Ti} \\ b \text{ ba} \text{ bc} \text{ ba} \end{array} \right.$
- 11) $\begin{array}{c} \text{Tw} \alpha \text{ i} \\ b \text{ b} \end{array} \left| \begin{array}{c} \text{w} \text{ Ma Ti} \\ b \text{ cb} \text{ ba} \text{ ba} \text{ b} \text{ b} \end{array} \right.$

The three quotations can all be divided into two parts, a recitation on b and a musical formula with the ambitus a - c on the last four syllables. The three occurrences are all different. For line 9, however, a close parallel is given by Strunk.⁶ It is, therefore, perhaps legitimate to let line 9 represent the cadence of the simple psalmody of Deuterios. However that may be, it is evident that a rather more ornamented shape of the cadence is used in the ordinary context.

- 4) $\begin{array}{c} \gamma \epsilon \\ G \text{ a} \end{array} \left| \begin{array}{c} \text{Ma Ti sou} \\ b \text{ c} \text{ aG} \text{ a} \text{ b} \text{ cb} \text{ b} \text{ G} \end{array} \right.$
- 7) $\begin{array}{c} \alpha \cdot \\ b \end{array} \left| \begin{array}{c} \text{E} \text{ Ma Ti} \\ b \text{ c} \text{ aG} \text{ a} \text{ b} \text{ d} \text{ c} \text{ ba} \text{ G} \end{array} \right.$
- 13) $\begin{array}{c} \delta \gamma \\ G \text{ a} \end{array} \left| \begin{array}{c} \text{Ma Ti sou} \\ b \text{ c} \text{ aG} \text{ a} \text{ b} \text{ cb} \text{ b} \text{ G} \end{array} \right.$
- 15) $\begin{array}{c} \delta \nu \\ b \end{array} \left| \begin{array}{c} \text{Ma Ti sou} \\ c \text{ b} \text{ c} \text{ aG} \text{ a} \text{ b} \text{ cb} \text{ b} \text{ G} \end{array} \right.$
- 17) $\begin{array}{c} \epsilon \nu \\ b \end{array} \left| \begin{array}{c} \text{Ma Ti sou} \\ c \text{ b} \text{ c} \text{ a} \text{ b} \text{ c} \text{ a} \text{ bG} \text{ a} \text{ G} \text{ D} \end{array} \right.$
- 19) $\begin{array}{c} \epsilon \gamma \\ G \text{ a} \end{array} \left| \begin{array}{c} \text{Ma Ti sou} \\ b \text{ c} \text{ aG} \text{ a} \text{ b} \text{ cb} \text{ b} \text{ G} \end{array} \right.$

6. Strunk, op. cit. p. 171, from Doxology in Laura I 185.

Three features are here to be observed,

- a) the combination Petasthé + leap of a third at the beginning of the cadence.
- b) the cadences never end on b, but on G (in 17 even on D preparing the following movement).
- c) the formulas in lines 4, 13 and 19 follow immediately after the sequence Ga whereas the formulas in lines 7, 15 and 17 follow after the recitation b as in lines 9 and 11.

The position of the cadence can be seen in diagram 2.

b) *Opening patterns.*

The opening phrases of line 9, 10 and 11 are as follows,

9) $\begin{array}{c} \text{ḡ} \quad \text{ḡ} \quad \text{ḡ} \quad \text{ḡ} \\ \text{ḡ} \quad \text{ḡ} \quad \text{ḡ} \quad \text{ḡ} \\ \text{G} \quad \text{a} \quad \text{b} \quad \text{b} \end{array}$

10) $\begin{array}{c} \text{ḡ} \quad \text{ḡ} \\ \text{ḡ} \quad \text{ḡ} \\ \text{b} \quad \text{b} \end{array}$

11) $\begin{array}{c} \text{ḡ} \quad \text{ḡ} \quad \text{ḡ} \\ \text{ḡ} \quad \text{ḡ} \quad \text{ḡ} \\ \text{G} \quad \text{a} \quad \text{b} \end{array}$

The variation is evidently of the same kind as in Protos: either a repetitive tone (now on b) or a motif with musical stressing following the text accentuation. The similarity between the opening motif $\text{ḡ} \text{ḡ} \text{ḡ}$ and the standard intonation of Deuterios $\text{ḡ} \text{ḡ} \text{ḡ}$ is striking, cf. below p.23.

In the two ordinary Psalms the motif is used no less than twentyfive times, cf. Ex.3, p.29. It opens all lines except 5, 8, 14, 16, 20 (refrain lines;) and, besides, subdivides the lines 3, 4, 6, 9, 13, 15 and 19. There seems to be a tendency of reshaping the motif into Gabc etc. in occurrences inside the line. In a way line 10 has two opening phrases the first of which is the recitation of $\delta\acute{o}\xi\alpha \kappa\alpha\tau\acute{\alpha}$ on the tone b elaborated on $\kappa\alpha\tau\acute{\alpha}$, the next following immediately after in the form $\text{ḡ} \text{ḡ} \text{ḡ}$ merging into the first medial formula. G a ba

For the position of the opening patterns see diagram 2, p.36.

Tritos

a) The psalmodic cadence.

- 9) $\begin{array}{c|c} \text{Tw } \sigma & \text{Tw } \sigma \\ \text{c c} & \text{d G a a} \end{array} \quad \begin{array}{c} \text{Petasth} \\ \text{Petasth} \end{array} \begin{array}{c} > \times \pi \\ > \times \pi \end{array}$
- 10) $\begin{array}{c|c} \text{Tw } \sigma & \text{Tw } \sigma \\ \text{c c c} & \text{d c b a b} \end{array} \quad \begin{array}{c} \text{Petasth} \\ \text{Petasth} \end{array} \begin{array}{c} > \times \pi \\ > \times \pi \end{array}$
- 11) $\begin{array}{c|c} \text{Tw } \sigma & \text{Tw } \sigma \\ \text{c c} & \text{d c b a b c} \end{array} \quad \begin{array}{c} \text{Petasth} \\ \text{Petasth} \end{array} \begin{array}{c} > \times \pi \\ > \times \pi \end{array}$

All three formulas follow upon the recitation tone c of the mode and begin with the note d. In line 9 follows a leap of a fifth down to G. In 10 and 11 the formulas consist of a series of downward steps from d to the note a followed in 10 by b leading on to the c at the opening of the next line and in 11 by b and c forming the transition to the following Sticheron. The formula $\begin{array}{c} \text{Petasth} \\ \text{Petasth} \end{array} \begin{array}{c} > \times \pi \\ > \times \pi \end{array}$ will be taken to represent the cadence of the simple psalmody.

The cadence is found again in lines 4, 7, 13, 15 and 19, but only as variations of the simple cadence.

- 4) $\begin{array}{c|c} \text{Tw } \sigma & \text{Tw } \sigma \\ \text{c} & \text{d c b a b c d c c a} \end{array} \quad \begin{array}{c} \text{Petasth} \\ \text{Petasth} \end{array} \begin{array}{c} > \times \pi \\ > \times \pi \end{array}$
- 7) $\begin{array}{c|c} \text{Tw } \sigma & \text{Tw } \sigma \\ \text{c} & \text{d c b a b c e d c a} \end{array} \quad \begin{array}{c} \text{Petasth} \\ \text{Petasth} \end{array} \begin{array}{c} > \times \pi \\ > \times \pi \end{array}$
- 13) $\begin{array}{c|c} \text{Tw } \sigma & \text{Tw } \sigma \\ \text{c} & \text{d c b a b c d c c a} \end{array} \quad \begin{array}{c} \text{Petasth} \\ \text{Petasth} \end{array} \begin{array}{c} > \times \pi \\ > \times \pi \end{array}$
- 15) $\begin{array}{c|c} \text{Tw } \sigma & \text{Tw } \sigma \\ \text{c} & \text{d c b a b c d c c a} \end{array} \quad \begin{array}{c} \text{Petasth} \\ \text{Petasth} \end{array} \begin{array}{c} > \times \pi \\ > \times \pi \end{array}$
- 19) $\begin{array}{c|c} \text{Tw } \sigma & \text{Tw } \sigma \\ \text{c} & \text{d c b a b c d c c a} \end{array} \quad \begin{array}{c} \text{Petasth} \\ \text{Petasth} \end{array} \begin{array}{c} > \times \pi \\ > \times \pi \end{array}$

The characteristic pattern of the model may, however, still be found in the variations. The Petasth on d is still seen followed by the Apóstrophoi and the formula ends on the note a. In 4 and 7 the Petasth is replaced by the figure $\begin{array}{c} \text{Petasth} \\ \text{Petasth} \end{array} \begin{array}{c} > \times \pi \\ > \times \pi \end{array}$. Line 13 and 15 are identical and have the Petasth on d, while 19 has a combination of the Petasth and the neumes of 4 and 7. In 4, 7, and 19 the steps dcba are indicated by

opening of 9 the conclusion may be that the mode uses a recitation on c as opening phrase.

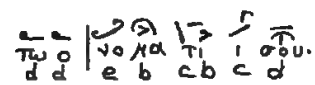
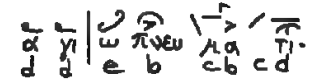
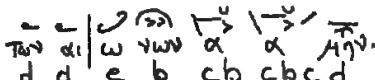
This opening is found in the following positions often in conjunction with the following medial formula. See Ex. 4, p.30.

Evidently, the opening phrase for the ordinary Psalms in the mode of Tritos must be a recitation on c. For occurrences cf. diagram 3.

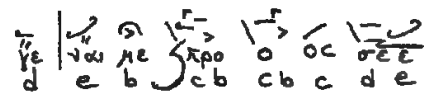
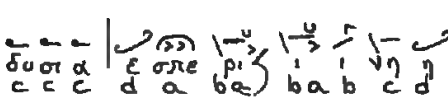
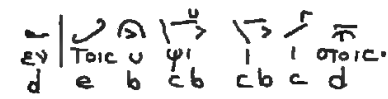
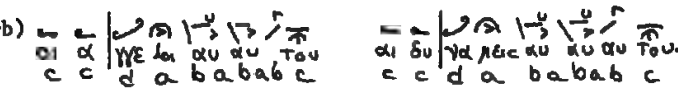
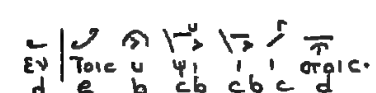
Tetartos.

a) *The psalmodic cadence.*

As the cadences of lines 9, 10 and 11 in the mode of Tetartos are identical, they may all be taken to represent the cadence of the simple psalmody.

- 9) 
- 10) 
- 11) 

The same formula is used as cadences in lines 4, 7, 13, 15 and 19:

- 4) 
- 7) 
- 13) 
- 15a+b) 
- 19) 

Line 15 is divided into two half-lines, a and b, with identical melody. Thus, the cadence appears twice. Its neumes are identical with the

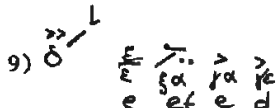
neumes of the rest of the cadences in the text, but the melody lies a second lower than the melody of the model cadence, and this is also the case of the cadence in line 7.

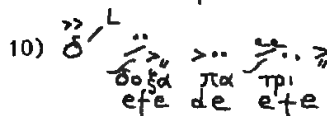
The ordinary Psalms, then, use the cadence of the simple psalmody also in Tetartos.

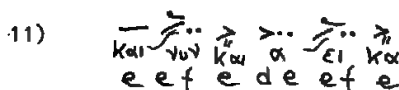
The occurrences are shown in diagram 4, p.36.

b) *Opening patterns.*


A comparison between the opening patterns of lines 9, 10 and 11 in the mode of Tetartos results in determining the opening phrase of 9 as the model opening phrase of the simple psalmody.

9) 

10) 

11) 

Similar openings are found in 1, 3, 4, 6, 13, 15, 17 and 19. Cf. Ex.5, p.31,

In 1 the opening phrase is preceded by a succession of notes on the word *κύριε* leading up to it while in the rest of the occurrences the line begins immediately with the phrase which in all cases is conjunct with the following medial formula. The group of neumes  is replaced in line 4 and 6 by a Petasthē.

The opening phrase of 6 lies a second lower than usual as a parallel to the lower cadence in 7. This is also the case of the two occurrences in 15 and in 17.

Thus, in Tetartos also the opening phrase follows the simple psalmody, The positions of the phrases are indicated in diagram 4.

o o o

First Plagal Mode.

a) *The psalmodic cadence.*

For lines 9, 10 and 11 the first plagal mode has one cadence only.

b) Opening patterns.

9) $\begin{matrix} \text{A} & \text{B} \\ \text{C} & \text{D} \end{matrix}$ $\begin{matrix} \text{E} & \text{F} & \text{G} & \text{H} \end{matrix}$

10) $A^{\alpha\beta} = \begin{pmatrix} \delta^\alpha_\beta & \xi^\alpha_\beta & \pi^\alpha_\beta & \tau^\alpha_\beta & \kappa^\alpha_\beta \\ G & E & F & a & G \end{pmatrix}$

11) $\begin{array}{ccccc} \dot{\bar{K}} & \dot{\bar{K}} & \dot{\bar{K}} & \dot{\bar{K}} & \dot{\bar{K}} \\ K\omega & \nu\nu & K\omega & a & \varepsilon & K\omega \\ G & G & F & FG & a & G \end{array}$

In this mode line 9 has an opening of its own, the opening pattern of the simple psalms, then, is taken to be that of lines 10 or 11.

This opening is found again slightly varied in lines 6, 13, 15 and 19, and in more elaborated forms also in lines 3, 4 and 7. See Ex. 6, p. 32.

For occurrences cf. diagram 5, p.37.

Second Plagal Mode.

a) *The psalmodic cadence.*

In this mode the cadence of line 10 differs from the cadence of lines 9 and 11.

9) $\frac{Tw}{aa} \mid \frac{bc}{G} \frac{H\alpha}{G} \frac{\alpha}{a} \frac{js}{ba} \frac{\alpha}{G} \frac{Ti}{E} \frac{\sigma\sigma}{E}$

[illegible]

11) $\begin{array}{c|cc} & \begin{array}{c} \text{Tw} \\ \text{a} \end{array} & \begin{array}{c} \text{a} \\ \text{a} \end{array} \\ \hline & \begin{array}{c} \omega \\ \text{b} \end{array} & \begin{array}{c} \gamma \\ \text{G} \end{array} \end{array} \quad \begin{array}{c|cc} & \begin{array}{c} \omega \\ \text{b} \end{array} & \begin{array}{c} \gamma \\ \text{a} \end{array} \\ \hline & \begin{array}{c} \omega \\ \text{b} \end{array} & \begin{array}{c} \gamma \\ \text{a} \end{array} \end{array} \quad \begin{array}{c|cc} & \begin{array}{c} \omega \\ \text{b} \end{array} & \begin{array}{c} \gamma \\ \text{a} \end{array} \\ \hline & \begin{array}{c} \omega \\ \text{b} \end{array} & \begin{array}{c} \gamma \\ \text{a} \end{array} \end{array} \quad \begin{array}{c|cc} & \begin{array}{c} \omega \\ \text{b} \end{array} & \begin{array}{c} \gamma \\ \text{a} \end{array} \\ \hline & \begin{array}{c} \omega \\ \text{b} \end{array} & \begin{array}{c} \gamma \\ \text{a} \end{array} \end{array} \quad \begin{array}{c|cc} & \begin{array}{c} \omega \\ \text{b} \end{array} & \begin{array}{c} \gamma \\ \text{a} \end{array} \\ \hline & \begin{array}{c} \omega \\ \text{b} \end{array} & \begin{array}{c} \gamma \\ \text{a} \end{array} \end{array}$

The formula in line 10 ends on the note G and leads on to the opening of the following line. It is found again in line 1 where it is also leading on to the next line,

1) $\frac{K_{eq}}{D}$ $\frac{J_{eq}}{D}$ $\frac{J_{K_{eq}}}{D}$ $-\frac{J_{K_{eq}}}{D}$ $\frac{J_{K_{eq}}}{D}$ $\frac{J_{K_{eq}}}{D}$ $\frac{J_{K_{eq}}}{D}$

It will, therefore, be considered as a medial formula.

The cadence is differently elaborated in its two occurrences. It is the longer form (line 9) which we find in lines 4, 7, 13, 15 and 19 in nearly identical variations. For occurrences cf. diagram 6, p.37.

- 6)
- | | | | | | | | |
|----|-----|-----|-----|-----|-----|-----|-----|
| κα | τευ | του | του | του | του | του | του |
| E | E | E | G | F | E | a | G |
- 12)
- | | | | | | | | |
|----|---|---|---|---|---|---|----|
| κα | α | α | α | α | α | α | α |
| E | G | F | E | G | F | E | FG |
- 15)
- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| α | α | α | α | α | α | α | α |
| E | G | F | E | G | F | E | |
- 17)
- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| α | α | α | α | α | α | α | α |
| E | G | F | E | G | F | E | |

Also the refrains employ a variation of this opening, often conjunct with the following medial formula as in lines 5, 8, 14, 16, 18 and 20.

- 5)
- | | | |
|---|----|---|
| α | α | α |
| E | FG | E |
- 8)
- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| α | α | α | α | α | α | α | α |
| E | F | G | E | F | D | D | a |
- 14)
- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| α | α | α | α | α | α | α | α |
| E | F | G | E | F | D | | |
- 16)
- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| α | α | α | α | α | α | α | α |
| E | F | G | E | F | D | | |
- 18)
- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| α | α | α | α | α | α | α | α |
| E | F | G | a | G | | | |
- 20)
- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| α | α | α | α | α | α | α | α |
| E | F | G | E | F | D | | |

For total occurrences of the opening pattern cf. diagram 6.

Barys.

a) *The psalmodic cadence.*

From a comparison between the endings of lines 9, 10 and 11 we may conclude that the formula in its shortest form consists of a leap of a

third from the note b down to the note G; the b is always indicated by a Petasthé. Only in line 10 is the note a from the previous formula or recitation included in the cadence itself.

$$9) \begin{array}{c} \text{a} \text{ a} \mid \text{b} \text{ G} \text{ G} \text{ a} \text{ F} \text{ G} \\ \text{a} \text{ a} \mid \text{b} \text{ G} \text{ G} \text{ a} \text{ F} \text{ G} \end{array}$$

$$10) \begin{array}{c} \text{a} \text{ a} \mid \text{a} \text{ a} \text{ b} \text{ G} \text{ G} \\ \text{a} \text{ a} \mid \text{a} \text{ a} \text{ b} \text{ G} \text{ G} \end{array}$$

$$11) \begin{array}{c} \text{a} \text{ a} \mid \text{b} \text{ G} \text{ G} \text{ G} \\ \text{a} \text{ a} \mid \text{b} \text{ G} \text{ G} \text{ G} \end{array}$$

Thus, this will be considered as the simple psalmodic cadence of the mode, and it is found again at the ends of most of the verses of our ordinary Psalms.

However, the end of line 12 as well as all refrain endings employ a different cadence. As this is the one that appears as psalmodic cadence in Strunk's example⁸ - see above p.5 - we have to operate with two cadences for the moment:

$$c^a: \begin{array}{c} \text{a} \text{ a} \mid \text{b} \text{ G} \text{ G} \text{ G} \\ \text{a} \text{ a} \mid \text{b} \text{ G} \text{ G} \text{ G} \end{array}$$

$$c^b: \begin{array}{c} \text{a} \text{ a} \mid \text{a} \text{ a} \text{ b} \text{ G} \text{ G} \text{ F} \\ \text{a} \text{ a} \mid \text{a} \text{ a} \text{ b} \text{ G} \text{ G} \text{ F} \end{array}$$

The formula c^a is found in 2, 4, 13, 15, 18 and 19. Line 19 has a formula of its own reminding of the cadence formula of Protos. Cf. Ex. 7, p.33.

The formula c^b is found in 2, 5, 8, 12, 14, 16 and 20. Notice that at the end of line 2 the manuscript adds c^b as an alternative. Cf. Ex. 7, p.33.

The occurrences of c^a and c^b can be seen in diagram 7, p.37.

b) Opening patterns.

The opening pattern of Barys is characteristic in being very simple consisting only of a leap of a fifth from D to a and vice versa. The pattern contains a long or short recitation either on the deep tone or on the high.

8. Strunk, op. cit. p. 171.

- 9) $\psi^{\bar{v}}$ $\begin{array}{ccccccc} >\eta & \overline{\psi^{\bar{v}}}^L & >\chi & \overline{\epsilon} & \overline{\epsilon} & \overline{\epsilon} & \overline{\psi^{\bar{v}}}^L \\ \epsilon & \psi^{\bar{v}} & \gamma\alpha & \tau\epsilon & \epsilon\kappa & \phi\omega & \lambda\alpha & \kappa\eta\epsilon \\ D & a & D & D & D & D & D & a \end{array}$
- 10) $\psi^{\bar{v}}$ $\begin{array}{ccc} >\chi & \overline{\epsilon} & \overline{\psi^{\bar{v}}}^L \\ \delta\omega & \xi\alpha & \pi\alpha & \tau\pi\iota \\ a & D & D & a \end{array}$
- 11) $\begin{array}{cccc} \overline{\psi^{\bar{v}}} & \overline{\psi^{\bar{v}}}^L & \overline{\epsilon} & \overline{\psi^{\bar{v}}}^L \\ \kappa\alpha\iota & \nu\omega\gamma & \kappa\alpha\iota & \alpha\tau & \epsilon\iota \\ D & a & a & a & a \end{array}$

As this pattern is the same in all three lines it is taken to be the opening phrase of the psalmody for the mode of Barys. It is found again in lines 1, 12, 13, 15 and 17, cf. also diagram.

- 1) $\psi^{\bar{v}}$ $\begin{array}{ccccccc} \overline{\psi^{\bar{v}}} & >\chi & \overline{\epsilon} & \overline{\psi^{\bar{v}}}^L & \overline{\epsilon} & \overline{\psi^{\bar{v}}}^L \\ \kappa\omega & \rho\iota & \epsilon & \kappa\epsilon & \kappa\rho\alpha & \xi\alpha \\ a & D & D & D & a & a \end{array}$
- 12) $[\psi^{\bar{v}}]$ $\begin{array}{ccc} >\chi & \overline{\epsilon} & \overline{\psi^{\bar{v}}}^L \\ \pi\alpha & \sigma\alpha & \pi\nu\omega & \delta\iota \\ a & D & D & a \end{array}$
- 13) $\begin{array}{ccc} >\eta & \overline{\psi^{\bar{v}}}^L & \overline{\epsilon} \\ \alpha\iota & \nu\epsilon\iota & \tau\epsilon \\ D & a & a \end{array}$
- 15) $\begin{array}{ccc} >\eta & \overline{\psi^{\bar{v}}}^L & \overline{\epsilon} \\ \alpha\iota & \nu\epsilon\iota & \tau\epsilon \\ D & a & a \end{array}$
- 17) $\psi^{\bar{v}}$ $\begin{array}{ccccccc} >\eta & \overline{\psi^{\bar{v}}}^L & >\chi & \overline{\epsilon} & \overline{\psi^{\bar{v}}}^L & \overline{\epsilon} & \overline{\psi^{\bar{v}}}^L \\ \alpha\iota & \nu\epsilon\iota & \tau\epsilon & \tau\omega\gamma & \kappa\omega & \rho\iota & \sigma\omega\gamma \\ D & a & D & D & a & a & a \end{array}$

Fourth Plagal Mode

a) The psalmodic cadence.

The cadences of lines 9, 10 and 11 are the same, in line 10 slightly shortened.

- 9) $\begin{array}{c} \overline{\psi^{\bar{v}}} \quad \overline{\psi^{\bar{v}}}^L \quad | \quad \overline{\psi^{\bar{v}}} \quad >\eta \quad \overline{\psi^{\bar{v}}}^L \quad > \quad > \\ \tau\omega & \omega & \nu\omega & \mu\alpha & \alpha & \tau\iota & \sigma\omega\gamma \\ G & G & a & b & c & b & a & G \end{array}$
- 10) $\begin{array}{c} \overline{\psi^{\bar{v}}} \quad \overline{\psi^{\bar{v}}}^L \quad | \quad \overline{\psi^{\bar{v}}} \quad \overline{\psi^{\bar{v}}}^L \quad >\eta \quad \overline{\psi^{\bar{v}}}^L \\ \alpha & \gamma\iota & \omega & \pi\epsilon\upsilon\omega & \mu\alpha & \tau\iota & \varsigma \\ a & b & b & b & c & a & a & G & F \end{array}$

$$11) \begin{array}{c} \text{di} \\ \text{Ga} \end{array} \left| \begin{array}{c} \text{w} \\ \text{bc} \end{array} \right| \begin{array}{c} \text{an} \\ \text{a} \end{array} \begin{array}{c} \text{cu} \\ \text{c} \end{array} \begin{array}{c} \text{au} \\ \text{ba} \end{array} \begin{array}{c} \text{a} \\ \text{G} \end{array}.$$

It is found again, though more elaborated, in lines 4, 7, 13 and 19 all ending on the note a instead of the note G.

$$4) \begin{array}{c} \text{YE} \\ \text{Ga} \end{array} \left| \begin{array}{c} \text{di} \\ \text{bc} \end{array} \right| \begin{array}{c} \text{HE} \\ \text{aG} \end{array} \begin{array}{c} \text{EE} \\ \text{ab} \end{array} \begin{array}{c} \text{EE} \\ \text{cb} \end{array} \begin{array}{c} \text{EE} \\ \text{ba} \end{array} \begin{array}{c} \text{EE} \\ \text{a} \end{array}.$$

$$7) \begin{array}{c} \text{an} \\ \text{Gab} \end{array} \begin{array}{c} \text{di} \\ \text{b} \end{array} \left| \begin{array}{c} \text{EE} \\ \text{bc} \end{array} \right| \begin{array}{c} \text{HE} \\ \text{aG} \end{array} \begin{array}{c} \text{EE} \\ \text{ab} \end{array} \begin{array}{c} \text{EE} \\ \text{cb} \end{array} \begin{array}{c} \text{EE} \\ \text{ba} \end{array} \begin{array}{c} \text{EE} \\ \text{a} \end{array}.$$

$$13) \begin{array}{c} \text{EE} \\ \text{Ga} \end{array} \left| \begin{array}{c} \text{di} \\ \text{bc} \end{array} \right| \begin{array}{c} \text{HE} \\ \text{aG} \end{array} \begin{array}{c} \text{EE} \\ \text{ab} \end{array} \begin{array}{c} \text{EE} \\ \text{cb} \end{array} \begin{array}{c} \text{EE} \\ \text{ba} \end{array} \begin{array}{c} \text{EE} \\ \text{a} \end{array}.$$

$$19) \begin{array}{c} \text{EE} \\ \text{Ga} \end{array} \left| \begin{array}{c} \text{di} \\ \text{cb} \end{array} \right| \begin{array}{c} \text{HE} \\ \text{a} \end{array} \begin{array}{c} \text{EE} \\ \text{G} \end{array} \begin{array}{c} \text{EE} \\ \text{ab} \end{array} \begin{array}{c} \text{EE} \\ \text{cb} \end{array} \begin{array}{c} \text{EE} \\ \text{ba} \end{array} \begin{array}{c} \text{EE} \\ \text{a} \end{array}.$$

For total occurrences cf. diagram 8.

b) *Opening patterns.*

$$9) \begin{array}{c} \text{EE} \\ \text{a} \end{array} \begin{array}{c} \text{di} \\ \text{aG} \end{array} \begin{array}{c} \text{HE} \\ \text{G} \end{array} \begin{array}{c} \text{EE} \\ \text{G} \end{array}.$$

$$10) \begin{array}{c} \text{di} \\ \text{a} \end{array} \begin{array}{c} \text{HE} \\ \text{G} \end{array} \begin{array}{c} \text{EE} \\ \text{G} \end{array}.$$

$$11) \begin{array}{c} \text{HE} \\ \text{E} \end{array} \begin{array}{c} \text{EE} \\ \text{FE} \end{array} \begin{array}{c} \text{EE} \\ \text{F} \end{array} \begin{array}{c} \text{EE} \\ \text{G} \end{array} \begin{array}{c} \text{EE} \\ \text{G} \end{array}.$$

There is no modal signature in front of line 9. Maybe the initial Oligon is reckoned from the finalis of the preceding Psalm-verse.

The openings of line 9 and 10 are the same, the opening of line 11 differs and seems to be a linking formula beginning on the extra, final note F of the cadence of line 10, and thus the openings of lines 9 and 10 will be taken to represent the opening phrase of the simple psalmody.

the beginnings. For this purpose the eight modes display a variety of devices: they may have a fixed formula of their own which recurs in variations in the melodies as in Tetartos and First Plagal, or a fixed formula now and then alternating with a recitation tone alone as in Protos and Deuteros. Tritos and Barys begin on a recitation tone, in Barys elaborated so that the recitation takes place either on D or on a. The opening of the Second Plagal mode is similar to the intonation melody of the mode, as is also the case in First Plagal lines 1, 9, 12 and 17. The opening of Deuteros reminds of the second half of the intonation melody, and the Fourth Plagal could be a variation of the intonation melody also. Both recitation and formula may occur in conjunction with the following medial formula as in Tritos and Second Plagal.

Protos		alternative	
Deuteros		alternative	
Tritos			
Tetartos			
First Plagal			
Second Plagal			
Barys			
Fourth Plagal			

In some cases, however, exceptions to this rule may be found (Ex.10-11 and 12-19, pp.38-57).

Line 1. Ps. 140:1 - first half-verse: the opening formula of Tetartos is introduced by a sequence of ascending notes.

Line 4. Ps. 140:1 - second half-verse: Tritos employs a medial formula, Second Plagal a recitation on a, and Barys what could be a variation of the alternative cadence c^b from line 2.

Line 6. Ps. 140:2 - first half-verse: Barys has an alternative medial formula.

Line 9. Ps. 141:8 - first half-verse: Here Protos has the recitation on a as given by Strunk (cf. p. 5).

Lines 10-11. Δόξα - In the case of Tritos, Second Plagal and Fourth Plagal the opening pattern is omitted in line 11 and replaced by a medial formula forming the transition between line 10 and 11.

Line 12. Ps. 150:6. - Tetartos has the same ascending sequence as in line 1, here, however, followed by a medial formula.

Line 13. P. 148:1 - Second Plagal has a medial formula.

Line 17. Ps. 148:1 - Tetartos has a medial formula.

Line 19. Ps. 148:2 - Both Second Plagal and Barys employ a medial formula.

In addition to these occurrences Protos, Deuterios, Tritos, Tetartos First Plagal and Fourth Plagal mark the repetition of Ps. 140:1, first half-verse, in line 3, where Second Plagal and Barys have a medial formula. Normally, Ps. 140:2, line 7, is not treated as a half-verse and line openers are found in Deuterios, First Plagal and Fourth Plagal only.

Protos, Deuterios and Tetartos divide the following verse lines in smaller parts by inserted opening patterns.

Protos: Lines 4, 6, 13 and 19.

Deuterios: Lines 3, 4, 6, 9, 13, 15 and 19.

Tetartos: Line 15.

The Refrains.

Finally, opening patterns are occasionally used in the refrains in the following places: Protos and Deuterios lines 2 and 18, Second Plagal in all refrains except line 2. Normally, however, the refrains do not employ the same melodic formulas as the psalmtxts and these lines, i. e. lines 2, 5, 8, 14, 16, 18 and 20 will therefore be omitted from the remaining investigation.

Medial Formulas.

As was the case with the opening patterns and the cadences the medial formulas will be determined through a comparison between lines 9, 10 and 11 (Ex. 10-11).

As a rule these medial formulas are in good harmony with the examples from the psalmody given by Strunk.⁹ Frequently, however, Sinai 1255 uses a greater number of medial formulas than Laura I 185 (Strunk's source):

Tritos: M_2 (Protos M_2 and Barys M_1 , but starting from c, not from a) and M_3 . Notice that both these formulas reach the pitch of e

9. Strunk, op. cit. p. 171.

and so pass the pitch shown in Strunk's example.

Plagios Deuterios: M_2 and M_3 , the latter being used in a somewhat different form in the Ordinary psalms (Ex. 17).

Barys: M_1 (=Protos M_2) and M_2 (=Protos M_1), both in the same pitch as in Protos.

Plagios Tetartos: M_2 and M_3 ; the latter does not occur in the Ordinary psalms (Ex. 19).

In the Ordinary settings (Exx. 12-19)¹⁰ all modes except *Plagios Protos* and *Plagios Tetartos* use still more medial formulas than in their simple psalmody (Exx. 10-11):

Protos: M_3

Deuterios: M_4 (=Protos M_3 , but starting from b, not from a).

Tritos: M_4 , M_5 and M_6 .

Tetartos: M_3 .

Plagios Deuterios: M_4 .

Barys: M_4 (=Plagios Deuterios M_4 , same pitch) and M_5 .

In *Plagios Protos*, lines 1 and 17, the intonation melody is used instead of a medial formula; in line 15 the elaboration of M_2 makes it look like the elaborated opening patterns of lines 6 and 15. This together with the placing of the formula seems to indicate that the line may have been felt as bipartite.

The medial formulas of *Tetartos* seem to occur in two pitches depending on whether the line begins on e or d.

The order of the medial formulas in the Ordinary settings is not bound to follow the order in lines 9, 10 and 11, but when a mode has more than one formula extra as in *Tritos* and *Barys*, these formulas always repeat the order in which they first occurred.

The extra formulas seem to divide the text into smaller units than provided by the opening patterns and the cadences, often as the division of a line into two halves, and they seem to be employed and placed with the intention of stressing particular aspects of the meaning of the text and therefore set off individual words.

There is a tendency for the extra formulas of the authentic modes to function as endings either of the lines or of the half-lines as e.g. in

10. Ad Ex. 15: In *Tetartos* the scribe has overlooked the beginning of line 13, cf. f. 183^v of the MS, but for the analysis compensation has been found in the corresponding formula from a copy of Chrysaphes's *Anastasimatarion*, f. 68^r, belonging to the library of the Institute of Greek and Latin Medieval Philology.

Protos lines 1, 3 and 6 (Ex. 20) and for the formulas of the plagal modes to function as beginnings as e.g. in Plagios Deuterios lines 1 and 6 (Ex. 24).

These extra medial formulas are often followed by a punctuation mark as in Deuterios line 3 (Ex. 13) or the last syllable or word of the formula is stressed by an Apódërma or Diplē as e.g. Plagios Deuterios line 6 (Ex. 17) and Barys line 6 (Ex. 18).

The extra formulas are not found in line 15 in any of the modes.

The distribution of these formulas can be seen in Exx. 20-25, pp.58-63.

o o o

The conclusion of the investigation of the melodies to κύριε ἐκέκραξα and Παῖσα πνοή in the manuscript Sinai 1255 must be that these melodies are ornamentation of the musical material used in the simple doxology and psalmody (lines 9-11). Their elaborate recitation is framed in an opening pattern and a cadence both of which mainly employ the simple formulas. Mostly the simple formulas of Sinai 1255 are the 'Koukouzelian' ones mentioned by Strunk (Cf. above p.5). Barys, however, introduces a different cadence and transfers the 'Koukouzelian' cadence to the refrains.

Sometimes a cadence is missing and the line must be connected with the following line or refrain, sometimes an opening pattern is replaced by the intonation melody or recitation tones. The opening pattern is more widely used than the cadence because it can be used in the refrains also and in connection with medial formulas to divide longer lines into smaller units.

In six of the modes ornamented medial formulas occur which go beyond the simple psalmody of Sinai 1255 and the 'Koukouzelian' doxologies as published by Strunk.

Though these extra formulas from a structural point of view must be termed medial formulas, they apparently had a function of their own dividing the lines into smaller units. Thus if the half-verse is neither marked by the structure of the melody nor by an opening phrase or a cadence, it may be marked by such a medial formula. Curiously enough authentic and plagal modes seem to behave differently in this respect: in the authentic modes the extra medial formulas have a tendency to be placed at the end of the line, in the plagal modes they are mainly placed at the beginning.

The above analyses have been inspired by an idea of Jørgen Raasted's put forward in the discussion at The Sixteenth International Congress Of

Byzantine Studies in 1981.¹¹ They have extended the material of 1981 to comprise all modes including also the Orthros material (Πασα πνοή). But still, the data from one isolated manuscript may be considered too narrow a basis for any definitive conclusions, and the inevitable 'subjectivity' of the investigation - especially as to the division into musical formulas - will no doubt make details open to criticism; but nevertheless it is a step towards understanding one of the central parts of Byzantine chant.

o o o

Ex. 1

1. Κύριε, ἐκέκραξα πρὸς σέ, εἰσάκουσόν μου,
2. εἰσάκουσόν μου, Κύριε.
3. Κύριε, ἐκέκραξα πρὸς σέ, εἰσάκουσόν μου;
4. πρὸς χεῖρας τῆς φωνῆς τῆς δεξιᾶς μου, ἐν τῷ κεκραγέναι με πρὸς σέ;
5. εἰσάκουσόν μου, κύριε.
6. Κατευθυνθήτω ἡ προσευχή μου, ὡς θυμίαμα ἐνώπιόν σου;
7. ἔπαρσις τῶν χειρῶν μου θυσία ἐσπερινή;
8. εἰσάκουσόν μου, κύριε.
9. ἐξάγαγε ἐκ φυλακῆς τὴν ψυχὴν μου, τοῦ ἐξομολογήσασθαι τῷ ὀνόματί σου.
10. δόξα πατρὶ καὶ υἱῷ καὶ ἁγίῳ πνεύματι
11. καὶ νῦν καὶ ἀεὶ καὶ εἰς τοὺς αἰῶνας τῶν αἰώνων ἀμήν.
12. πᾶσα πνοὴ αἰνεσάτω τὸν κύριον.
13. αἰνεῖτε τὸν κύριον ἐκ τῶν οὐρανῶν, αἰνεῖτε αὐτὸν ἐν τοῖς ὑψίστοις.
14. σοὶ πρέπει ὕμνος τῷ θεῷ.
15. αἰνεῖτε αὐτόν, πάντες οἱ ἄγγελοι αὐτοῦ; αἰνεῖτε αὐτόν, πᾶσαι αἱ δυνάμεις αὐτοῦ.
16. σοὶ πρέπει ὕμνος τῷ θεῷ.
17. αἰνεῖτε τὸν κύριον ἐκ τῶν οὐρανῶν.
18. σοὶ πρέπει ὕμνος τῷ θεῷ.
19. αἰνεῖτε τὸν κύριον ἐκ τῶν οὐρανῶν, αἰνεῖτε αὐτόν ἐν τοῖς ὑψίστοις.
20. σοὶ πρέπει ὕμνος τῷ θεῷ.

11. Jahrbuch der Österreichischen Byzantinistik 32/7, Wien 1982, p. 133.

Opening Patterns Deuterios:

1. $\begin{array}{c} \text{ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ku pi e.} \\ \text{G a b} \end{array}$	13a. $\begin{array}{c} \text{ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ai vei te} \\ \text{G a b b} \end{array}$
2. $\begin{array}{c} \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ei oia} \\ \text{G a b} \end{array}$	13b. $\begin{array}{c} \text{> ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ek twv} \\ \text{G a b} \end{array}$
3a. $\begin{array}{c} \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ku pi e} \\ \text{G a b b} \end{array}$	13c. $\begin{array}{c} \text{> ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ai vei ei te w tot.} \\ \text{G a b c b a G} \end{array}$
3b. $\begin{array}{c} \text{> ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{pros oe ei ...} \\ \text{G a b b} \end{array}$	13d. $\begin{array}{c} \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ei toic} \\ \text{G a b c} \end{array}$
4a. $\begin{array}{c} \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{prothe ti} \\ \text{G a b b} \end{array}$	15a. $\begin{array}{c} \text{ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ai vei te} \\ \text{G a b b} \end{array}$
4b. $\begin{array}{c} \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ei twke kra ye vai} \\ \text{G G G G a b c} \\ \text{G G a b c} \end{array}$	15b. $\begin{array}{c} \text{> ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ai vei te au ton} \\ \text{G a b b b b} \end{array}$
6a. $\begin{array}{c} \text{ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ka teu tw tw} \\ \text{b G G a b b} \end{array}$	17. $\begin{array}{c} \text{ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ai vei te} \\ \text{G a b} \end{array}$
6b. $\begin{array}{c} \text{> ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{wc tw mi a ma.} \\ \text{G G a b b b} \end{array}$	18. $\begin{array}{c} \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{oi pre...} \\ \text{G a b} \end{array}$
7. $\begin{array}{c} \text{> ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{e por oia} \\ \text{G a b b} \end{array}$	19a. $\begin{array}{c} \text{ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ai vei te} \\ \text{G a b b} \end{array}$
9. $\begin{array}{c} \text{ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{e fa ya ye.} \\ \text{G a b b b} \end{array}$	19b. $\begin{array}{c} \text{> ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ek twv} \\ \text{G a b} \end{array}$
10. $\begin{array}{c} \text{ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{do fa pa ti ka uvi..} \\ \text{b b bcha b G a ba} \end{array}$	19c. $\begin{array}{c} \text{> ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ai vei ...} \\ \text{G a b} \end{array}$
11. $\begin{array}{c} \text{> ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ka tw kai} \\ \text{G a b b} \end{array}$	19d. $\begin{array}{c} \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{ei toic} \\ \text{G a b c} \end{array}$
12. $\begin{array}{c} \text{ῥ} \quad \text{—} \quad \text{—} \quad \text{—} \quad \text{—} \\ \text{pa oi pio n} \\ \text{G G a b} \end{array}$	



Opening Patterns Tritos:

1. $\begin{array}{ccc} \text{e} & \text{e} & \text{e} \\ \text{z} & \text{z} & \text{z} \end{array}$ $\begin{array}{ccc} \text{ku} & \text{pi} & \text{e} \\ \text{c} & \text{c} & \text{c} \end{array}$
3. $\begin{array}{ccc} \text{e} & \text{e} & \text{e} \\ \text{z} & \text{z} & \text{z} \end{array}$ $\begin{array}{ccccccc} \text{ku} & \text{pi} & \text{e} & \text{e} & \text{e} & \text{ke} & \text{kp} \\ \text{c} & \text{c} & \text{c} & \text{a} & \text{b} & \text{cd} & \text{c} \end{array}$
6. $\begin{array}{ccc} \text{e} & \text{e} & \text{e} \\ \text{z} & \text{z} & \text{z} \end{array}$ $\begin{array}{cccc} \text{ku} & \text{teu} & \text{e} & \text{e} \\ \text{c} & \text{c} & \text{a} & \text{b} \end{array}$
12. $\begin{array}{ccc} \text{e} & \text{e} & \text{e} \\ \text{z} & \text{z} & \text{z} \end{array}$ $\begin{array}{ccc} \text{ku} & \text{pi} & \text{e} \\ \text{c} & \text{c} & \text{c} \end{array}$
13. $\begin{array}{ccc} \text{e} & \text{e} & \text{e} \\ \text{z} & \text{z} & \text{z} \end{array}$ $\begin{array}{ccccccc} \text{ku} & \text{pi} & \text{e} & \text{e} & \text{e} & \text{ke} & \text{kp} \\ \text{c} & \text{c} & \text{c} & \text{a} & \text{b} & \text{cd} & \text{c} \end{array}$
15. $\begin{array}{ccc} \text{e} & \text{e} & \text{e} \\ \text{z} & \text{z} & \text{z} \end{array}$ $\begin{array}{ccc} \text{ku} & \text{teu} & \text{e} \\ \text{c} & \text{c} & \text{a} \end{array}$
17. $\begin{array}{ccc} \text{e} & \text{e} & \text{e} \\ \text{z} & \text{z} & \text{z} \end{array}$ $\begin{array}{ccc} \text{ku} & \text{pi} & \text{e} \\ \text{c} & \text{c} & \text{c} \end{array}$
19. $\begin{array}{ccc} \text{e} & \text{e} & \text{e} \\ \text{z} & \text{z} & \text{z} \end{array}$ $\begin{array}{ccccccc} \text{ku} & \text{pi} & \text{e} & \text{e} & \text{e} & \text{ke} & \text{kp} \\ \text{c} & \text{c} & \text{c} & \text{a} & \text{b} & \text{cd} & \text{c} \end{array}$

Opening Patterns Tetartos:

1. δ $\overset{\sim}{\text{ku}} \overset{\sim}{\text{pi}} \overset{\sim}{\text{ie}} \overset{\sim}{\text{ke}} \overset{\sim}{\text{e}} \overset{\sim}{\text{kp}} \overset{\sim}{\text{ia}} \overset{\sim}{\text{e}} \overset{\sim}{\text{a}}.$
cb c d e e fe ed d
3. $\overset{\sim}{\text{ku}} \overset{\sim}{\text{pi}} \overset{\sim}{\text{e}} \overset{\sim}{\text{e}} \overset{\sim}{\text{e}} \overset{\sim}{\text{e}}.$
efe d e cd
4. $\overset{\sim}{\text{ep}} \overset{\sim}{\text{o}} \overset{\sim}{\text{ie}} \overset{\sim}{\text{te}} \overset{\sim}{\text{th}} \overset{\sim}{\text{e}} \overset{\sim}{\text{u}} \dots$
e fe d e c de
6. δ $\overset{\sim}{\text{ka}} \overset{\sim}{\text{teu}} \overset{\sim}{\text{tu}} \overset{\sim}{\text{teu}} \overset{\sim}{\text{e}}.$
d c d ded ce
13. $\overset{\sim}{\text{ei}} \overset{\sim}{\text{te}} \overset{\sim}{\text{to}} \overset{\sim}{\text{ku}} \dots$
e f e d f
- 15a. δ $\overset{\sim}{\text{ai}} \overset{\sim}{\text{te}} \overset{\sim}{\text{ou}} \overset{\sim}{\text{to}} \overset{\sim}{\text{ov}}.$
d ded cd d fed
- 15b. δ $\overset{\sim}{\text{ai}} \overset{\sim}{\text{te}} \overset{\sim}{\text{ou}} \overset{\sim}{\text{to}} \overset{\sim}{\text{ov}}.$
d ded cd d f ed
17. δ $\overset{\sim}{\text{ai}} \overset{\sim}{\text{te}} \overset{\sim}{\text{e}} \overset{\sim}{\text{e}}.$
d e d edc
19. $\overset{\sim}{\text{ai}} \overset{\sim}{\text{te}} \overset{\sim}{\text{to}} \overset{\sim}{\text{ku}} \dots$
e efe de e

Opening Patterns First Plagal:

3. $\begin{array}{c} \text{ku} \text{ pi} \text{ e} \text{ e} \text{ ke} \text{ kpa} \dots \\ \text{G a F e E F G a G} \end{array}$
4. $\begin{array}{c} \text{pro} \text{ so} \text{ x} \text{ c} \text{ t} \text{ n} \text{ o} \text{ w} \text{ n} \text{ t} \text{ n} \text{ c} \\ \text{G a F G E F G a G G} \end{array}$
6. $\begin{array}{c} \text{ka} \text{ teu} \text{ su} \text{ n} \text{ tw} \text{ n} \\ \text{G E F a b a G} \end{array}$
7. $\begin{array}{c} \text{e} \text{ pro} \text{ o} \text{ c} \text{ tw} \text{ x} \text{ ei} \text{ p} \text{ w} \text{ n} \text{ kou} \\ \text{G a G a G a F G F e F G a G G} \end{array}$
13. $\begin{array}{c} \text{oi} \text{ v} \text{ ei} \text{ te} \text{ ton} \text{ ku} \text{ pi} \text{ o} \text{ n} \\ \text{G G E F a G G} \end{array}$
15. $\begin{array}{c} \text{oi} \text{ v} \text{ ei} \text{ te} \text{ ou} \text{ ton} \text{ pan} \text{ tel} \\ \text{G G E F a b a G} \end{array}$
19. $\begin{array}{c} \text{oi} \text{ v} \text{ ei} \text{ te} \text{ ton} \text{ ku} \text{ pi} \text{ o} \text{ n} \\ \text{G G E F a G G} \end{array}$

Opening Patterns Fourth Plagal:

1. $\delta \delta^{\frac{u}{\pi}}$ $\frac{u}{\pi} > \frac{u}{\pi}$
 $\alpha \alpha \alpha \alpha$
3. $\frac{u}{\pi} > \frac{u}{\pi}$
 $\alpha \alpha \alpha \alpha$
4. $\frac{u}{\pi} > \frac{u}{\pi}$
 $\alpha \alpha \alpha \alpha$
6. $\frac{u}{\pi} > \frac{u}{\pi}$
 $\alpha \alpha \alpha \alpha$
7. $\frac{u}{\pi} > \frac{u}{\pi}$
 $\alpha \alpha \alpha \alpha$
12. $\delta \delta^{\frac{u}{\pi}}$ $\frac{u}{\pi} > \frac{u}{\pi}$
 $\alpha \alpha \alpha \alpha$
13. $\frac{u}{\pi} > \frac{u}{\pi}$
 $\alpha \alpha \alpha \alpha$
15. $\frac{u}{\pi} > \frac{u}{\pi}$
 $\alpha \alpha \alpha \alpha$
17. $\delta \delta^{\frac{u}{\pi}}$ $\frac{u}{\pi} > \frac{u}{\pi}$
 $\alpha \alpha \alpha \alpha$
19. $\frac{u}{\pi} > \frac{u}{\pi}$
 $\alpha \alpha \alpha \alpha$

Psalmodic Cadences:

Protos	9.	$\frac{e}{a} \mid \frac{c}{bc} \frac{a}{a} \frac{b}{b} \frac{G}{G} \frac{a}{a} \frac{a}{a}$
Deuteros	9.	$\frac{e}{b} \mid \frac{c}{c} \frac{a}{a} \frac{b}{b} \frac{b}{b}$
Tritos	11.	$\frac{e}{c} \mid \frac{d}{d} \frac{c}{c} \frac{b}{b} \frac{a}{a} \frac{bc}{bc}$
Tetartos	9.	$\frac{e}{d} \mid \frac{c}{e} \frac{b}{b} \frac{c}{c} \frac{b}{b} \frac{c}{c} \frac{d}{d}$
First Plagal	10.	$\frac{e}{G} \mid \frac{c}{a} \frac{b}{F} \frac{a}{E} \frac{b}{D}$
Second Plagal	11.	$\frac{e}{a} \mid \frac{c}{b} \frac{a}{G} \frac{b}{b} \frac{c}{a} \frac{b}{G} \frac{a}{F} \frac{b}{G}$
Barys	11.	$\frac{e}{a} \mid \frac{c}{b} \frac{a}{G} \frac{b}{G} \frac{b}{G}$
Barys	2.	$\frac{e}{a} \mid \frac{c}{a} \frac{b}{a} \frac{c}{a} \frac{b}{a} \frac{c}{a} \frac{b}{a} \frac{c}{a} \frac{b}{a}$
Fourth Plagal	9.	$\frac{e}{Ga} \mid \frac{c}{bc} \frac{a}{a} \frac{b}{c} \frac{a}{ba} \frac{b}{G}$

Diagram no. 1: PROTOS

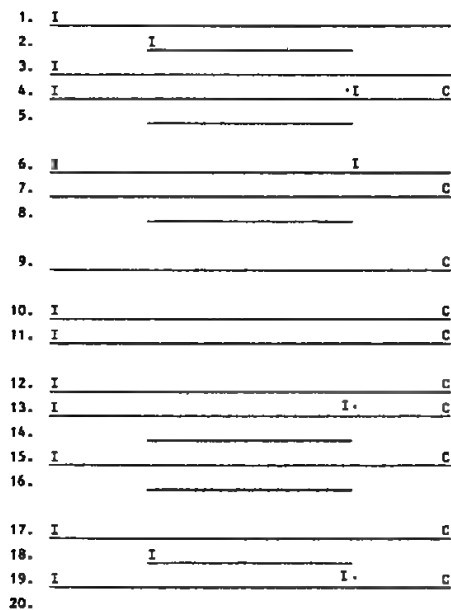


Diagram no. 2: DEUTEROS

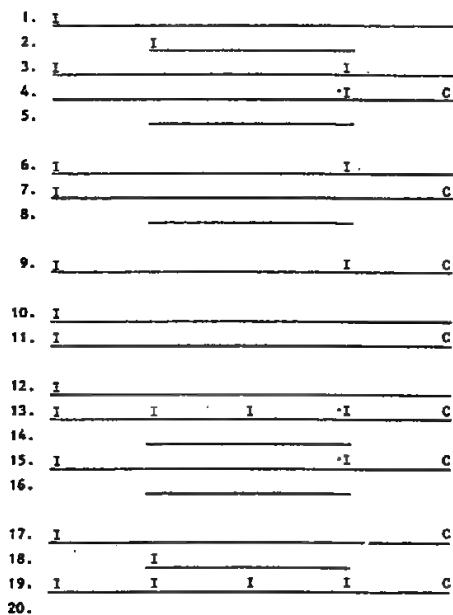


Diagram no. 3: TRITOS

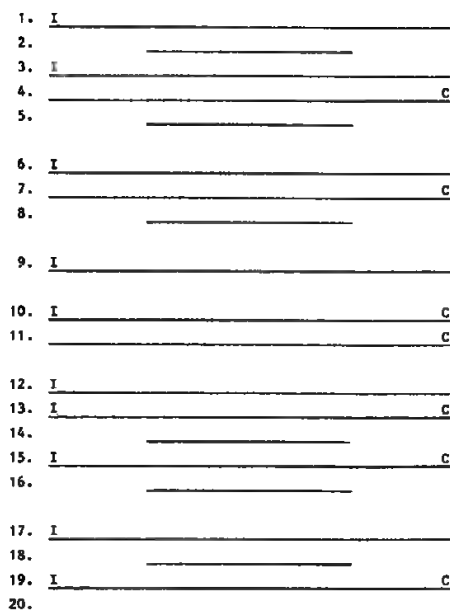


Diagram no. 4: TETARTOS

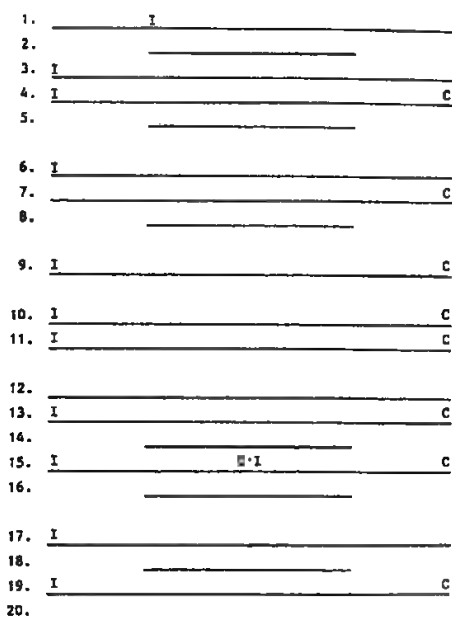


Diagram no. 5: FIRST PLAGAL

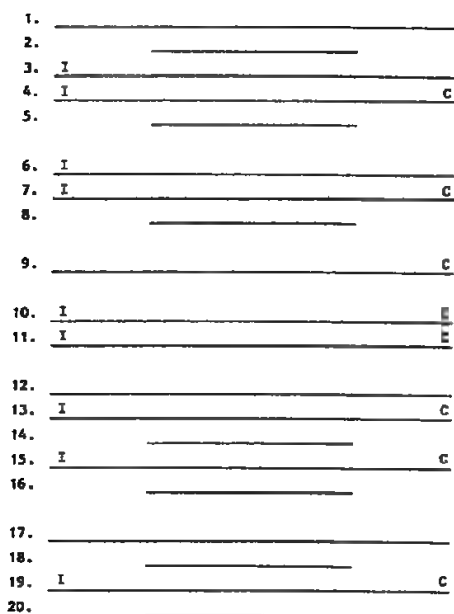


Diagram no. 6: SECOND PLAGAL

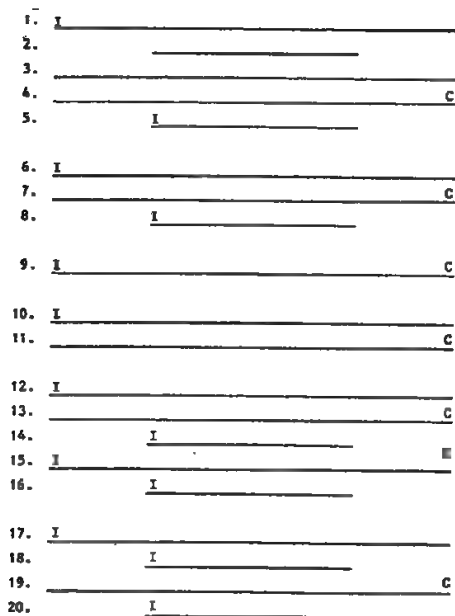


Diagram no. 7: BARYS

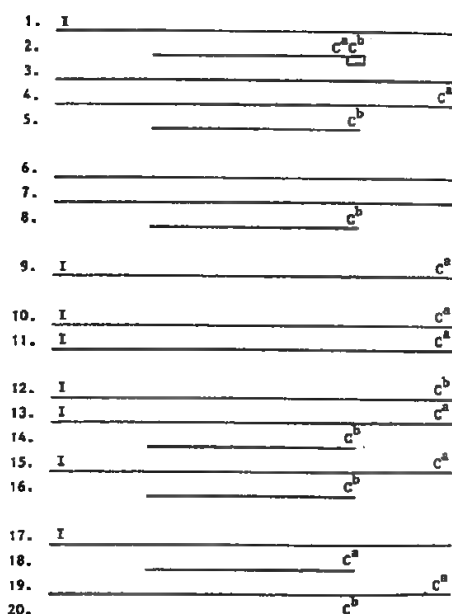
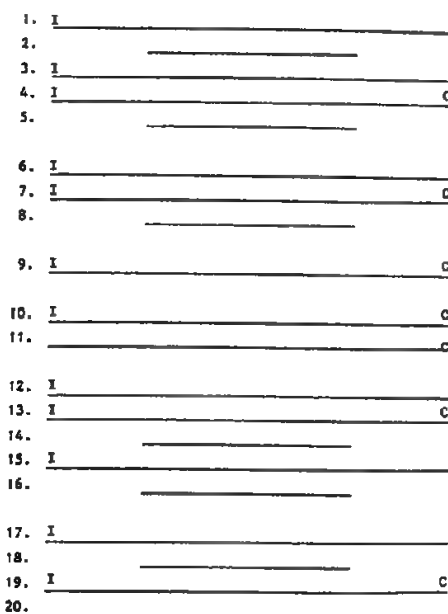


Diagram no. 8: FOURTH PLAGAL



Example 10

$\begin{array}{c} \text{EF} \\ \text{Ga} \end{array} \text{a a a}$

$\begin{array}{c} \text{EF} \\ \text{Ga} \end{array}$

$\begin{array}{c} \text{EF} \\ \text{Ga} \end{array}$

$\begin{array}{c} \text{EF} \\ \text{Ga} \end{array} \text{a a a}$

$\begin{array}{c} \text{EF} \\ \text{Ga} \end{array}$

$\begin{array}{c} \text{EF} \\ \text{Ga} \end{array}$

$\begin{array}{c} \text{EF} \\ \text{Ga} \end{array} \text{a a a}$

$\begin{array}{c} \text{EF} \\ \text{Ga} \end{array}$

$\begin{array}{c} \text{EF} \\ \text{Ga} \end{array}$

$\begin{array}{c} \text{EF} \\ \text{Ga} \end{array} \text{a a a}$

$\begin{array}{c} \text{EF} \\ \text{Ga} \end{array}$

$\begin{array}{c} \text{EF} \\ \text{Ga} \end{array}$

Example 11

Handwritten musical notation for Example 11, featuring two systems of staves with notes, rests, and lyrics in a non-Latin script.

System 1:

- Staff 1:** Notes: \dot{c} , \dot{d} , \dot{e} , \dot{f} , \dot{g} . Lyrics: \dot{c} \dot{d} \dot{e} \dot{f} \dot{g} .
- Staff 2:** Notes: \dot{c} , \dot{d} , \dot{e} , \dot{f} , \dot{g} . Lyrics: \dot{c} \dot{d} \dot{e} \dot{f} \dot{g} .
- Staff 3:** Notes: \dot{c} , \dot{d} , \dot{e} , \dot{f} , \dot{g} . Lyrics: \dot{c} \dot{d} \dot{e} \dot{f} \dot{g} .
- Staff 4:** Notes: \dot{c} , \dot{d} , \dot{e} , \dot{f} , \dot{g} . Lyrics: \dot{c} \dot{d} \dot{e} \dot{f} \dot{g} .

System 2:

- Staff 1:** Notes: \dot{c} , \dot{d} , \dot{e} , \dot{f} , \dot{g} . Lyrics: \dot{c} \dot{d} \dot{e} \dot{f} \dot{g} .
- Staff 2:** Notes: \dot{c} , \dot{d} , \dot{e} , \dot{f} , \dot{g} . Lyrics: \dot{c} \dot{d} \dot{e} \dot{f} \dot{g} .
- Staff 3:** Notes: \dot{c} , \dot{d} , \dot{e} , \dot{f} , \dot{g} . Lyrics: \dot{c} \dot{d} \dot{e} \dot{f} \dot{g} .
- Staff 4:** Notes: \dot{c} , \dot{d} , \dot{e} , \dot{f} , \dot{g} . Lyrics: \dot{c} \dot{d} \dot{e} \dot{f} \dot{g} .

Handwritten musical notation for Example 11, featuring two systems of staves with notes, rests, and lyrics in a non-Latin script.

System 1:

- Staff 1:** Notes: \dot{c} , \dot{d} , \dot{e} , \dot{f} , \dot{g} . Lyrics: \dot{c} \dot{d} \dot{e} \dot{f} \dot{g} .
- Staff 2:** Notes: \dot{c} , \dot{d} , \dot{e} , \dot{f} , \dot{g} . Lyrics: \dot{c} \dot{d} \dot{e} \dot{f} \dot{g} .
- Staff 3:** Notes: \dot{c} , \dot{d} , \dot{e} , \dot{f} , \dot{g} . Lyrics: \dot{c} \dot{d} \dot{e} \dot{f} \dot{g} .
- Staff 4:** Notes: \dot{c} , \dot{d} , \dot{e} , \dot{f} , \dot{g} . Lyrics: \dot{c} \dot{d} \dot{e} \dot{f} \dot{g} .

System 2:

- Staff 1:** Notes: \dot{c} , \dot{d} , \dot{e} , \dot{f} , \dot{g} . Lyrics: \dot{c} \dot{d} \dot{e} \dot{f} \dot{g} .
- Staff 2:** Notes: \dot{c} , \dot{d} , \dot{e} , \dot{f} , \dot{g} . Lyrics: \dot{c} \dot{d} \dot{e} \dot{f} \dot{g} .
- Staff 3:** Notes: \dot{c} , \dot{d} , \dot{e} , \dot{f} , \dot{g} . Lyrics: \dot{c} \dot{d} \dot{e} \dot{f} \dot{g} .
- Staff 4:** Notes: \dot{c} , \dot{d} , \dot{e} , \dot{f} , \dot{g} . Lyrics: \dot{c} \dot{d} \dot{e} \dot{f} \dot{g} .

[illegible][illegible]

12
 α α α α
 EF G a

13
 α α α α α α
 EF G a

14

15
 α α α α α α
 EF G a

16

17
 α α α α α α
 EF G a

18

19
 α α α α α α
 EF G a

20

M
 α α α α α α α α
 EF G a

M
 α α α α α α α α
 EF G a

M
 α α α α α α α α
 EF G a

M
 α α α α α α α α
 EF G a

M
 α α α α α α α α
 EF G a

M
 α α α α α α α α
 EF G a

M
 α α α α α α α α
 EF G a

M
 α α α α α α α α
 EF G a

M
 α α α α α α α α
 EF G a

M
 α α α α α α α α
 EF G a

M
 α α α α α α α α
 EF G a

M
 α α α α α α α α
 EF G a

M
 α α α α α α α α
 EF G a

M
 α α α α α α α α
 EF G a

[illegible][illegible]

[Handwritten notes and scribbles]

Handwritten musical notation on a single staff, featuring various notes, rests, and dynamic markings such as *ff* and *ffz*. The notation is written in a cursive, handwritten style.

1130
 2500
 2500
 1130
 2500
 2500
 1130
 2500
 2500

$\sqrt{25} = 5$
 $\sqrt{16} = 4$
 $\sqrt{9} = 3$
 $\sqrt{4} = 2$
 $\sqrt{1} = 1$
 $\sqrt{0} = 0$
 $\sqrt{-1} = i$
 $\sqrt{-4} = 2i$
 $\sqrt{-9} = 3i$
 $\sqrt{-16} = 4i$
 $\sqrt{-25} = 5i$
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 $\sqrt{-7569} = 87i$
 $\sqrt{-7744} = 88i$
 $\sqrt{-7921} = 89i$
 $\sqrt{-8100} = 90i$
 $\sqrt{-8281} = 91i$
 $\sqrt{-8464} = 92i$
 $\sqrt{-8649} = 93i$
 $\sqrt{-8836} = 94i$
 $\sqrt{-9025} = 95i$
 $\sqrt{-9216} = 96i$
 $\sqrt{-9409} = 97i$
 $\sqrt{-9604} = 98i$
 $\sqrt{-9801} = 99i$
 $\sqrt{-10000} = 100i$

[illegible][illegible]

$113 \rightarrow$
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 $9406 \rightarrow$
 $9507 \rightarrow$
 $9608 \rightarrow$
 $9709 \rightarrow$
 $9810 \rightarrow$
 $9911 \rightarrow$

[illegible]

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

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Handwritten musical notation and Greek text on a page from Sinai 1255, folios 174r-178v. The page contains eight systems of notation, each with a system number (1-8) and a key signature (e.g., M4, M5, M6, M7, M8). The notation is written in a stylized, cursive script, likely representing a form of Byzantine or Arabic musical notation. The Greek text is written in a similar cursive script, often interspersed with the musical notation. The page is numbered 46 in the top right corner.

1. M4 M5
2. M6 M7
3. M6 M7
4. M6 M7
5. M6 M7
6. M6 M7
7. M6 M7
8. M6 M7

* read:

Handwritten musical notation and Greek text at the bottom of the page, likely a continuation of the example or a related example.

[illegible]

$\frac{1}{x^2} = x^{-2}$

[illegible][illegible]

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[Handwritten notes and calculations, mostly illegible due to extreme blur.]

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c̣ v
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[illegible]

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$\begin{array}{c} \text{A}_1 \\ \hline \end{array}$

$\frac{1}{\sqrt{c}} \left(\frac{\partial}{\partial t} + v_c \frac{\partial}{\partial x} \right) \psi = -\frac{1}{\sqrt{c}} \left(\frac{\partial}{\partial t} + v_c \frac{\partial}{\partial x} \right) \psi$

$\frac{1}{\sqrt{c}} \cdot \frac{1}{\sqrt{c}} = \frac{1}{c}$

1971

[illegible]

$\hat{\lambda}_0^2$ 0
 λ_1^2 0
 λ_2^2 +
 λ_{-1}^2 0
 λ_{-2}^2 0
 λ_{-3}^2 0
 18 0
 13

2017
10-10-17
10-10-17
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10-10-17

$\frac{1}{\sqrt{2}} \begin{pmatrix} 1 & i \\ 1 & -i \end{pmatrix}$

[illegible]

1. 1000
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 100. 1000

[illegible]

Handwritten musical notation on a single staff, featuring various notes, rests, and dynamic markings such as *ff* and *pp*. The notation is written in ink and includes some annotations in the left margin.

1 H3 e
 1 2 E
 1 2 TW e
 1 2 VOL e
 1 2 ete
 1 2 E e
 1 2 E e
 1 2 E e
 1 2 E e

(Handwritten musical notation on a staff, likely representing a sequence of notes or chords.)

2010

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13

[illegible][illegible]

Handwritten musical notation on a single staff, featuring various notes, rests, and accidentals.

[illegible][illegible]

19

| | M4 | M3 | M2 | |
|----|----|----|----|----|
| 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 | 5 |
| 6 | 6 | 6 | 6 | 6 |
| 7 | 7 | 7 | 7 | 7 |
| 8 | 8 | 8 | 8 | 8 |
| 9 | 9 | 9 | 9 | 9 |
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| 12 | 12 | 12 | 12 | 12 |
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| 14 | 14 | 14 | 14 | 14 |
| 15 | 15 | 15 | 15 | 15 |
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| 86 | 86 | 86 | 86 | 86 |
| 87 | 87 | 87 | 87 | |

$\frac{A}{\lambda} \frac{j}{\omega} E$
 $\frac{C}{\lambda} \frac{j}{\omega} G$
 $\frac{D}{\lambda} \frac{j}{\omega} b$
 $\frac{E}{\lambda} \frac{j}{\omega} G$
 $\frac{F}{\lambda} \frac{j}{\omega} G$
 $\frac{G}{\lambda} \frac{j}{\omega} G$
 $\frac{H}{\lambda} \frac{j}{\omega} G$
 $\frac{I}{\lambda} \frac{j}{\omega} G$
 $\frac{J}{\lambda} \frac{j}{\omega} G$
 $\frac{K}{\lambda} \frac{j}{\omega} G$
 $\frac{L}{\lambda} \frac{j}{\omega} G$
 $\frac{M}{\lambda} \frac{j}{\omega} G$
 $\frac{N}{\lambda} \frac{j}{\omega} G$
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$$\left[\begin{array}{c} \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \\ \frac{1}{2} \end{array} \right]$$
[illegible]

| | | |
|----|-----|---|
| 12 | 100 | 0 |
| 11 | 100 | 0 |
| 10 | 100 | 0 |
| 9 | 100 | 0 |
| 8 | 100 | 0 |
| 7 | 100 | 0 |
| 6 | 100 | 0 |
| 5 | 100 | 0 |
| 4 | 100 | 0 |
| 3 | 100 | 0 |
| 2 | 100 | 0 |
| 1 | 100 | 0 |

13
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 $\frac{1}{\lambda}$ λ δ
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1000

三

[illegible]

11 1/2 0
1 2 0
1 0 0
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[illegible][illegible]

H3 0
 C₂ 0
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| 12 | 0 |
| 13 | 0 |
| 14 | 0 |
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| 99 | 0 |
| 100 | 0 |

[illegible]

19

$\frac{1}{2} \times \frac{1}{2}$

26

4

[illegible]

15 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

$\begin{matrix} \text{J}_0^{\circ} & d \\ \text{J}_1^{\circ} & d \\ \text{J}_2^{\circ} & d \\ \text{J}_3^{\circ} & u \\ \text{J}_4^{\circ} & u \\ \text{J}_5^{\circ} & u \\ \text{J}_6^{\circ} & u \\ \text{J}_7^{\circ} & d \\ \text{J}_8^{\circ} & d \\ \text{J}_9^{\circ} & d \end{matrix}$

52

ॐ नमो भगवते वासुदेवाय
ॐ नमो भगवते वासुदेवाय
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ॐ नमो भगवते वासुदेवाय
ॐ नमो भगवते वासुदेवाय

32

$\frac{A}{B} = \frac{C}{D}$

Handwritten notes on lined paper:

1. $\frac{1}{x^2} = x^{-2}$

2. $\frac{d}{dx} x^{-2} = -2x^{-3}$

3. $= -\frac{2}{x^3}$

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$\frac{1}{\sqrt{2}} \begin{pmatrix} 1 & i \\ 0 & 1 \end{pmatrix}$

| λ_1 | λ_2 | λ_3 |
|-------------|-------------|-------------|
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| 3 | 3 | 3 |
| 4 | 4 | 4 |
| 5 | 5 | 5 |
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| 97 | 97 | 97 |
| 98 | 98 | 98 |
| 99 | 99 | 99 |
| 100 | 100 | 100 |

$\frac{1}{\sqrt{2}} \begin{pmatrix} 1 & i \\ -1 & i \end{pmatrix}$

| | |
|-----|---|
| 73 | 6 |
| 153 | 8 |
| 18 | 5 |
| 20 | 6 |
| 193 | 4 |
| 24 | 0 |

$\frac{1}{\sqrt{\pi}} \int_{-\infty}^{\infty} f(x) \delta(x-a) dx = f(a)$

$\frac{1}{n_1}$

430
 260
 250
 230
 210
 190
 170
 150
 130
 110
 90
 70
 50
 30
 10
 0

[illegible]
$$\begin{array}{r} 100 \\ \times 10 \\ \hline 1000 \end{array}$$

Ps-140:1&2, Vespers.


ḡ^L

1. Κύριε, ἐκέκραξα, πρὸς σέ, εἰσάκουσόν μου,
2. εἰσάκουσόν μου, κύριε.
3. κύριε, ἐκέκραξα, πρὸς σέ, εἰσάκουσόν μου;
4. πρόσχες τῇ φωνῇ τῆς δεήσεώς μου,
ἐν τῷ κεκραγέναι με πρὸς σέ,
5. εἰσάκουσόν μου, κύριε.
6. Κατευθυνθήτω ἡ προσευχὴ μου, ὡς θυμίαμα ἐνώπιόν σου;
7. ἔπαρσις τῶν χειρῶν μου θυσία ἐσπερινή;
8. εἰσάκουσόν μου, κύριε.


Ps.150 & 148:1&2, Orthros.

ḡ^L

12. Πᾶσα πνοὴ αἰνεσάτω τὸν κύριον.
13. αἰνεῖτε τὸν κύριον ἐκ τῶν οὐρανῶν,
αἰνεῖτε αὐτὸν ἐν τοῖς ὑψίστοις.
14. σοὶ πρέπει ὕμνος τῷ θεῷ.
15. αἰνεῖτε αὐτόν, πάντες οἱ ἄγγελοι αὐτοῦ;
αἰνεῖτε αὐτόν, πᾶσαι αἱ δυνάμεις αὐτοῦ.
16. σοὶ πρέπει ὕμνος τῷ θεῷ.
17. Αἰνεῖτε τὸν κύριον ἐκ τῶν οὐρανῶν,
18. σοὶ πρέπει ὕμνος τῷ θεῷ.
19. αἰνεῖτε τὸν κύριον ἐκ τῶν οὐρανῶν,
αἰνεῖτε αὐτόν ἐν τοῖς ὑψίστοις.
20. σοὶ πρέπει ὕμνος τῷ θεῷ.

Ps.140:1&2, Vespers. 

1. Κύριε, ἐκέκραξα, πρὸς σέ, εἰσάκουσόν μου,
2. εἰσάκουσόν μου, κύριε.
3. κύριε, ἐκέκραξα, πρὸς σέ, εἰσάκουσόν μου;
4. πρόσχευς τῇ φωνῇ τῆς θεήσεως μου,
ἐν τῷ κεκραγέναι με πρὸς σέ,
5. εἰσάκουσόν μου, κύριε.
6. Κατευθυνθήτω ἡ προσευχή μου, ὡς θυμίαμα ἐνώπιόν σου;
7. ἔπαρσις τῶν χειρῶν μου θυσία ἐσπερινή;
8. εἰσάκουσόν μου, κύριε.

Ps.150 & 148:1&2, Orthros. 

12. Πᾶσα πνοὴ αἰνεσάτω τὸν κύριον.
13. αἰνεῖτε τὸν κύριον ἐκ τῶν οὐρανῶν,
αἰνεῖτε αὐτόν ἐν τοῖς ὑψίστοις.
14. σοὶ πρέπει ὕμνος τῷ θεῷ.
15. αἰνεῖτε αὐτόν, πάντες οἱ ἄγγελοι αὐτοῦ;
αἰνεῖτε αὐτόν πᾶσαι αἱ δυνάμεις αὐτοῦ.
16. σοὶ πρέπει ὕμνος τῷ θεῷ
17. Αἰνεῖτε τὸν κύριον ἐκ τῶν οὐρανῶν,
18. σοὶ πρέπει ὕμνος τῷ θεῷ.
19. αἰνεῖτε τὸν κύριον ἐκ τῶν οὐρανῶν,
αἰνεῖτε αὐτόν ἐν τοῖς ὑψίστοις.
20. σοὶ πρέπει ὕμνος τῷ θεῷ.

Ps.140:1&2, Vespers. $\Gamma \pi \swarrow$

1. Κύριε, ⁴ἐκέκραξα, ⁴πρὸς σέ, ⁵εἰσάκουσόν μου,
2. εἰσάκουσόν μου, κύριε. ^ε
3. κύριε, ⁶ἐκέκραξα, ⁶πρὸς σέ, ⁶εἰσάκουσόν μου;
4. πρόσχευς ⁶τῇ φωνῇ τῆς ⁶δεήσεώς μου,
ἐν τῷ κεκραγέναι με πρὸς σέ,
5. εἰσάκουσόν μου, κύριε.
6. κατευθυνθήτω ἡ ⁶προσευχὴ μου, ὡς θυμίαμα ⁶ἐνώπιόν σου;
7. ἔπαρσις ⁶τῶν χειρῶν μου θυσία ἐσπερινή;
8. εἰσάκουσόν μου, κύριε.

Ps.150 & 148:1&2, Orthros. $\Gamma \pi \swarrow$

12. ⁴Πᾶσα ⁵πνοὴ αἰνεσάτω τὸν κύριον.
13. αἰνεῖτε τὸν κύριον ⁶ἐκ τῶν οὐρανῶν,
αἰνεῖτε αὐτὸν ἐν τοῖς ὑψίστοις.
14. σοὶ πρέπει ὕμνος τῷ θεῷ.
15. αἰνεῖτε αὐτὸν, πάντες οἱ ἄγγελοι αὐτοῦ;
αἰνεῖτε αὐτὸν, πᾶσαι αἱ δυνάμεις αὐτοῦ.
16. σοὶ πρέπει ὕμνος τῷ θεῷ.
17. Αἰνεῖτε ⁴τὸν κύριον ⁵ἐκ τῶν οὐρανῶν.
18. σοὶ πρέπει ὕμνος τῷ θεῷ.
19. αἰνεῖτε τὸν κύριον ⁶ἐκ τῶν οὐρανῶν,
αἰνεῖτε αὐτὸν ἐν τοῖς ὑψίστοις.
20. σοὶ πρέπει ὕμνος τῷ θεῷ.

Ps.140:1&2, Vespers.



1. Κύριε, ἐκέκραξα, πρὸς σέ, εἰσάκουσόν μου.
2. εἰσάκουσόν μου, κύριε.
3. κύριε, ἐκέκραξα, πρὸς σέ, εἰσάκουσόν μου;
4. πρόσχες τῇ φωνῇ τῆς δεήσεώς μου,
ἐν τῷ κειραγέναι με πρὸς σέ,
5. εἰσάκουσόν μου, κύριε.
6. Κατευθυνθήτω ἡ προσευχή μου, ὡς θυμίαμα ἐνώπιόν σου;
7. ἔπαρσις τῶν χειρῶν μου θυσία ἐσπερινή;
8. εἰσάκουσόν μου, κύριε.

Ps.150 & 148:1&2, Orthros.



12. Πᾶσα πνοὴ αἰνεσάτω τὸν κύριον.
13. αἰνεῖτε τὸν κύριον ἐκ τῶν οὐρανῶν,
αἰνεῖτε αὐτὸν ἐν τοῖς ὑψίστοις.
14. σοὶ πρέπει ὕμνος τῷ θεῷ.
15. αἰνεῖτε αὐτόν, πάντες οἱ ἄγγελοι αὐτοῦ,
αἰνεῖτε αὐτόν, πᾶσαι αἱ δυνάμεις αὐτοῦ.
16. σοὶ πρέπει ὕμνος τῷ θεῷ.
17. Αἰνεῖτε τὸν κύριον ἐκ τῶν οὐρανῶν,
18. σοὶ πρέπει ὕμνος τῷ θεῷ.
19. αἰνεῖτε τὸν κύριον ἐκ τῶν οὐρανῶν,
αἰνεῖτε αὐτόν ἐν τοῖς ὑψίστοις.
20. σοὶ πρέπει ὕμνος τῷ θεῷ.

Ps.140:1&2, Vespers. $\text{π}^{\text{λ}} \text{ψ}$.

1. Κύριε, ἐκέκραξα, πρὸς σέ, εἰσάκουσόν μου.
2. εἰσάκουσόν μου, κύριε.
3. κύριε, ἐκέκραξα, πρὸς σέ, εἰσάκουσόν μου;
4. πρόσχες τῇ φωνῇ τῆς δεήσεώς μου,
ἐν τῷ κεκραγέναι με πρὸς σέ,
5. εἰσάκουσόν μου, κύριε.
6. Κατευθυνθήτω ἡ προσευχή μου, ὡς θυμίαμα ἐνώπιόν σου;
7. ἔπαρσις τῶν χειρῶν μου θυσία ἐσπερινή;
8. εἰσάκουσόν μου, κύριε.

Ps.150 & 148:1&2, Orthros. $\text{ψ}^{\text{λ}}$.

12. Πᾶσα πνοὴ αἰνεσάτω τὸν κύριον.
13. αἰνεῖτε τὸν κύριον ἐκ τῶν οὐρανῶν,
αἰνεῖτε αὐτὸν ἐν τοῖς ὑψίστοις.
14. σοὶ πρέπει ὕμνος τῷ θεῷ.
15. αἰνεῖτε αὐτόν, πάντες οἱ ἄγγελοι αὐτοῦ;
αἰνεῖτε αὐτόν, πᾶσαι αἱ δυνάμεις αὐτοῦ.
16. σοὶ πρέπει ὕμνος τῷ θεῷ.
17. Αἰνεῖτε τὸν κύριον ἐκ τῶν οὐρανῶν,
18. σοὶ πρέπει ὕμνος τῷ θεῷ.
19. αἰνεῖτε τὸν κύριον ἐκ τῶν οὐρανῶν,
αἰνεῖτε αὐτόν ἐν τοῖς ὑψίστοις.
20. σοὶ πρέπει ὕμνος τῷ θεῷ.

